How to sustainably manage recreational fishing: a meta-analysis of technical regulation instruments?

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Introduction

Fishing is one of most popular outdoor recreational activities in industrialized countries. It is estimated that there are at least 25 million recreational anglers in Europe, including 20 million freshwater recreational anglers. This figure is around 48 million in the United-States. The favorable of angling conditions in terms of biological quality, has a profound effect on the attractiveness and local development of these regions (Curtis and al., 2017). However, attracting a higher level of recreational and tourist activities in natural areas may increase pressure on some already vulnerable species (Cowx and al., 2010). Some recent studies, conducted in Canada and Australia, demonstrate that the pressure of non-market uses on certain fish can also lead to the collapse of certain populations (Cook and Cowx, 2006).
The preservation of aquatic biodiversity is essential to ensure the sustainability of recreational fishing. To achieve preservation objectives, several instruments have been implemented. Bag limits and size limits are the most popular instruments of regulation. These tools aim to reduce the effects "open access" on fish stocks available at a site. However, these tools are generally only effective where anglers have homogeneous preferences for fishing sites and species. There is some doubt as to whether these results still hold where the preferences of anglers are heterogeneous. This paper aims to demonstrate the ability of these regulation tools to meet preservation objectives when faced with recreational pressure and heterogeneous angler preferences. Essentially, we aim to verify the effectiveness of these tools regulating recreational fishing, with the aim of better protecting the biodiversity, particularly for endangered species.

Methods

In this paper, we conducted a systematic review of empirical studies into the effectiveness of regulatory instruments covering recreational fishing. We used meta-analysis. This approach allows synthesizing in a complete and rigorous way the results from different empirical works on the same subject. By including many different studies, the meta-analysis also increases the statistical power of the results and explains the variability of results between these different studies. The database that will be used in this meta-analysis is made up of 21 primary articles covering the period 2000-2016, with 354 observations, which we selected according to two criteria. In one hand, the use of Choice Experiment approach (CE) (Adamowicz and al., 1998) for the regulation of recreational fishing. In the second hand, these works provide the anglers' willingness-to-pay for different fishing conditions, including regulatory instruments. Our analysis develops a meta-regression approach where the objective is to explain the welfare variation of anglers as obtained through studies by based on a set of variables and an econometric model.

Results

The results from the meta-regression model suggest that there is a positive marginal willingness-to-pay for fishing sites that are subject to regulatory instruments. In other words, the anglers continue to visit the managed fishing sites with such measures, and are willing to pay up to 59€ per trip. Furthermore, the values of willingness-to-pay for a freshwater fishing trip are higher than saltwater fishing trips. There is no difference in anglers' willingness-to-pay between studies conducted in Europe and for the rest of the sample. Also, the anglers' willingness-to-pay is higher for a size limit instrument than for a bag limit instrument. This result is consistent with the theoretical results of Woodward and Griffin (2003).

The welfare variation expected from an improvement in fishing conditions, through the regulation of catches, is positive, but remains low, (6.68 € /angler /trip). This welfare variation would appear to be lower for migratory fish (Salmon, Trout and European eel). This suggests that anglers who target these types of fish fish (compared to anglers who target other types of fish) expect less benefit from improved fishing conditions through technical measures. Implementing bag limit management reduces the welfare variation of anglers by 50%.

Conclusion

This paper confirms that non-market economic valuation, in this case the choice experiments method (CE), can provide a useful indication for helping public decision making both in terms recreational management and protection of natural resources. In general, anglers will always look to improve their fishing conditions. Their willingness-to-pay is higher for the implementation of measures imposing a size limit than for a bag limit. This demand is higher for sites dedicated to migratory fish. However, these technical instruments of regulation are less effective for improving the well-being of anglers who target migratory fish.

Reference

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